

# GEOMETRY

## Unit 5 worksheet 1 Midsegment Theorem

### Target A

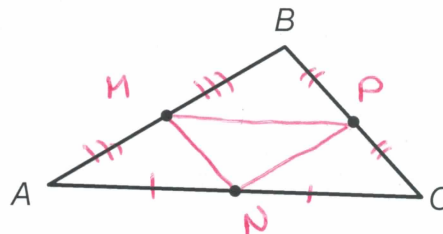
Name ANSWER KEY

Period \_\_\_\_\_ Date \_\_\_\_\_

1. In the triangle at the right, name the midpoints M, P, and N. Sketch in the midsegments.

Name the midsegments:

MP PN NM



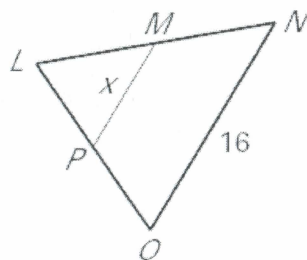
2. Use the picture that you completed to fill in the blanks.

According to the Midsegment Theorem,  $\overline{AB} \parallel \underline{\overline{PN}}$ ;  $\overline{BC} \parallel \underline{\overline{MP}}$ ;  $\overline{AC} \parallel \underline{\overline{MN}}$  and  $\frac{AB}{2} = \underline{\overline{PN}}$ ;

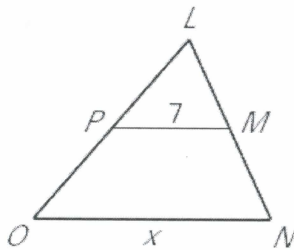
$$\frac{BC}{2} = \underline{\overline{MP}}; \frac{AC}{2} = \underline{\overline{MN}}$$

3. Mark and name 3 pairs of congruent segments:  $\overline{AN} \cong \overline{NC}$ ;  $\overline{BP} \cong \overline{PC}$ ;  $\overline{AM} \cong \overline{MB}$

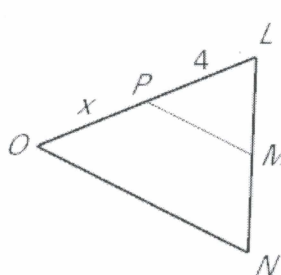
4.  $\overline{MP}$  is a midsegment of  $\triangle LNO$ , find the value of x.



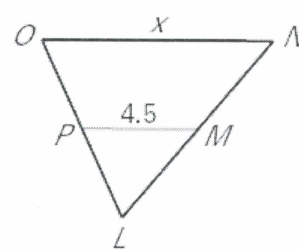
$$x = \underline{8}$$



$$x = \underline{14}$$



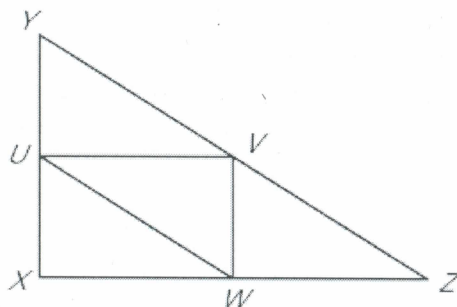
$$x = \underline{4}$$



$$x = \underline{9}$$

5.  $\overline{UW}$  is a midsegment of  $\triangle XYZ$ . Find the value of a, UW, and YZ.

$$UW = 4a - 1, YZ = 5a + 4.$$



$$a = \underline{2}$$

$$UW = \underline{7}$$

$$YZ = \underline{14}$$

$$\begin{aligned} 2(UW) &= YZ \\ 2(4a-1) &= 5a+4 \\ 8a-2 &= 5a+4 \\ 3a-2 &= 4 \\ 3a &= 6 \\ a &= 2 \end{aligned}$$

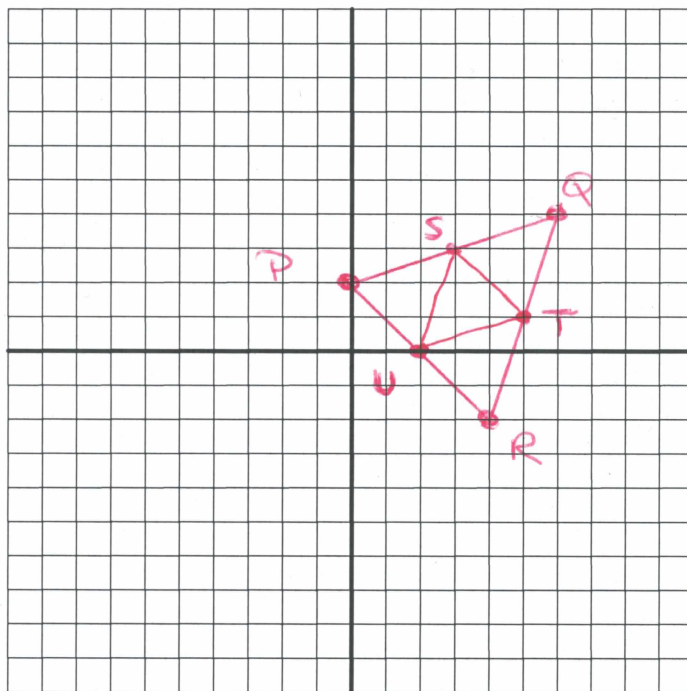
6. Graph and label the points P ( 0, 2); Q (6, 4); and R ( 4, -2). Connect to make  $\triangle PQR$

7. Use the midpoint formula  $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$  to find the midpoints S, T, and U.

$$\text{Midpoint of } \overline{PQ}, S = \left(\frac{0+6}{2}, \frac{2+4}{2}\right) = (3, 3)$$

$$\text{Midpoint of } \overline{QR}, T = \left(\frac{6+4}{2}, \frac{4-2}{2}\right) = (5, 1)$$

$$\text{Midpoint of } \overline{PR}, U = \left(\frac{0+4}{2}, \frac{2-2}{2}\right) = (2, 0)$$



Graph your midpoints. Do they seem to be in the middle of the segment? If not go back and check your work! Connect the midpoints to form the midsegments!

8. Use the distance formula  $d = \sqrt{|x_2 - x_1|^2 + |y_2 - y_1|^2}$  to find PR and ST. Round your answers to the hundredths place.

$$\begin{aligned} &= \sqrt{(4-0)^2 + (-2-2)^2} \\ &= \sqrt{16+16} \\ \text{PR} &= \sqrt{32} \approx 5.66 \end{aligned}$$

$$\begin{aligned} &= \sqrt{(5-3)^2 + (1-3)^2} \\ &= \sqrt{2^2 + (-2)^2} \\ \text{ST} &= \sqrt{8} \approx 2.83 \end{aligned}$$

Is the length of  $\overline{PR}$  twice the length of  $\overline{ST}$  ? If not, go back and check your work!

YES

9. Use the slope formula  $\frac{y_2 - y_1}{x_2 - x_1}$  to find the slope of  $\overline{PR}$  and  $\overline{ST}$ .

$$\text{Slope of } \overline{PR} = \frac{-2-2}{4-0} = \frac{-4}{4} = -1$$

$$\text{Slope of } \overline{ST} = \frac{1-3}{5-3} = \frac{-2}{2} = -1$$

Are these two slopes the same? If not go back and check your work.

YES